Baker referred to differences of opinion concerning the nests of these species but this may be linked with the confusion over the eggs. The nest of *C. leucurum* appears to be a cup nest usually placed in a cavity or crevice in a bank, or among overhanging rocks or tree-roots, usually by a stream, and usually hooded or domed where the site does not provide a natural roof. The material is fibrous rootlets and dead leaves, with green moss on the outside. The size is about 5.5 inches wide and deep externally, with a cavity about 2.5 inches wide and 1 inch deep. The nest of *N. grandis* is also built into a cavity in a bank or raised structure of some kind. It is made of fresh green moss and lined with fine roots. It is a cup with external diameter of *c.* 6 inches and *c.* 4 inches deep. The inner cup is *c.* 3 inches across and 1.5 inches deep.

As with some other clutches from Baker's collection (Harrison, in press) there appears to be evidence of clutches of normal or large size having been made up from several smaller clutches, and it would appear advisable to treat Baker's data on clutch size with due caution.

References:

Harrison, C. J. O. in press. Some clutches of wader eggs from E. C. Stuart Baker. *Bull. Brit. Orn. Cl.*

Guanay or Bougainville's Cormorant, *Phalacrocorax bougainvillii* (Lesson)

by A. W. Johnson

Received 9th November, 1965

In strictly commercial terms the Guanay Cormorant is without doubt the most valuable bird in the world, as the guano which it deposits on desert islands off the coast of Peru laid the foundation for a world-wide fertilizer industry in the past century and through its extensive use in present day Peruvian agriculture continues to represent a vital asset to that country's economy. Not without reason has it been called "The billion dollar bird".

Probably the most typical of all the birds of the Humboldt current, its centre of distribution is on the off-shore islands of central Peru on which it nests by the million and is responsible for about 85% of the guano deposited; once the reproductive cycle is over, it migrates from these islands moving south as far as Valdivia in Chile and, in lesser numbers, north to Punta Parinas in Peru.

These migrations are always confined to the cold waters of the Humboldt current, which parallels the coasts of Peru and part of Chile and presents one of the highest concentrations of organic life to be found anywhere in the world. Among its myriad forms is the "Anchovy", *Engraulis ringens*, and on this one fish the Guanay is completely dependent, a dependence which automatically regulates the entire population and hence the supply of guano from year to year.

Every so often, for reasons not yet properly understood, but which are apparently subject to cycles of approximately nine years, the Humboldt current deviates from its normal course, the temperature of the coastal waters rises, *Engraulis ringens* in its countless millions disappears and the Guanay is faced with starvation. Frantically the birds fly southwards in

search of the food that is no longer there, dying by the million and strewing the Peruvian and Chilean coasts with their bodies or with birds so weak and extenuated that death is only a question of hours. The following year the population at the nesting colonies, which may have built up to as high as 30 million, shows a steep decline; naturally the quantity of guano deposited drops in proportion and Peruvian agriculture is faced with serious after effects that can only be mitigated by careful regulation of the amount to be extracted from year to year.

The last occasion when this wholesale mortality took place was the year 1957 when, in addition to hundreds of thousands of dead birds strewn along the coasts, a number of observers reported the pathetic sight of small bands of these exclusively marine birds flying up the river valleys fruitlessly searching for the food that the sea had denied them, while the author personally watched a flock flying aimlessly hither and thither among the hills behind Valparaiso and saw one bird leave the rest and pitch among the branches of a eucalyptus tree.

In recent years another serious threat to the Guanay has developed in the form of a large scale fishmeal industry in Peru which competes with the birds for the same source of supply, *Engraulis ringens*. Although careful studies are being made, nobody can say at this stage just how "inexhaustible" this supply is, but on an accurate answer depends the future of the birds, of the supply of fertilizer for Peru's sugar and cotton crops and, to a large extent, of the fishmeal industry itself.

From March or April until October or November the Guanay is present in Chilean waters in enormous numbers and is particularly in evidence when the shoals of "Anchovies" come in close to the land. On these occasions the concentration of birds around the shoals staggers the imagination. What with the cormorants on the surface or diving, the gannets and pelicans plunging from the air, the gulls hovering above and the penguins and sea lions rounding them up from below, the unfortunate "Anchovies" may be seen jumping out of the water in all directions and the sea appears to boil with living organisms in their struggle for survival. No one watching such a scene can fail to be impressed by the prodigality and at the same time the wastefulness of nature.

A white-breasted cormorant with black upper parts, head and neck, the Guanay is also noted for its manner of flight in long V-shaped formations which sometimes run into hundreds of thousands of birds and stretch from horizon to horizon. When these formations encounter an obstacle such as a passing steamer it is interesting to note how they bend in the form of an arc which becomes more and more pronounced until finally one bird, more intrepid than the rest, breaks formation and passes astern of the vessel; immediately all the others follow suit and the "V" re-forms just as if nothing had happened.

For many years it was considered more than doubtful that the Guanay nested anywhere in Chilean territory, but in 1932 the well known missionary-naturalist Dillman S. Bullock reported the presence of a colony on an islet to the north of Moch island in Lat. 37° 20′ S., adding that the eggs were collected systematically by the islanders for food. Evidently this resulted in the ultimate abandonment of the colony, for when Dr. Behn visited the island in 1962 all that remained was a wasteland of deserted cones.

In 1944 William Vogt, a conservation expert who spent three years on the guano islands of Peru studying the complete life-cycle of these birds, made an aerial survey of the islands lying off the coast between Arica and Valparaiso without finding any trace of nesting activities.

However, in March of 1946 our colleague Dr. Philippi, watching the comings and goings of Guanays and other birds with powerful field glasses from a vantage point on the coast of Cochagua province in Lat. 33° 58′ S. came to the conclusion that there must be a nesting colony on the islet of Pupuya a couple of miles off the coast. This was confirmed in June of 1955 when our oceanographer friend from Peru, Enrique Avila, managed to land on this steep islet and found indications of a colony which he estimated at 80,000 birds. The nesting season was of course over at that date, but as he moved about among the rows of unmistakable nests, young birds of the year, some of them with patches of down still on the neck and head, scattered in all directions. It can be positively stated, therefore, that this cormorant does nest in Chile.

As already mentioned, the Guanay nests by the million on the islands off the Peruvian coast. This is true from Lobos de Tierra southwards and also to a lesser extent on some of the mainland promontories where special walled-in areas have been set aside by the Government to encourage the birds to establish auxiliary colonies.

Although some nests may be occupied at any time of year, the reproductive stream reaches its peak in November and December, when a density of three nests per square metre has been recorded from some of the islands.

Three or occasionally only two calcareous pale bluish eggs are laid, measuring on average 62.7 ± 1.36 × 40.3 ± 0.75mm.; in shape and coloration they are indistinguishable from those of other cormorants.

The Eastern Least Honey-guide *Indicator meliphilus* (Oberholser) in Rhodesia

by Michael P. Stuart Irwin

Received 12th November, 1965

The diminutive honey-guide *Indicator meliphilus* (Oberholser) has until now been recorded no further south than the Port Herald district of Malawi (Long 1961: 34). However, among a recent collection of birds from near the Haroni-Lusitu River junction in the Melsetter District of Rhodesia at 20° 02′ S., 33° 01′ E., there are four specimens of the genus *Indicator*. Three of these represent the widespread *I. minor* Stephens, but the fourth proves to be an example of *I. meliphilus*. It was collected by A. F. Graham in the Haroni valley on 22nd August, 1965 at 1,300 ft. in low trees growing among scrub and grass near the edge of lowland evergreen forest. Thanks are due to Mr. A. H. Siemers, leader of the expedition of the Prince Edward School Natural History Society, of Salisbury, who made this collection of birds on behalf of the National Museum of Southern Rhodesia.

It is a female, apparently adult, with wing 76.5, tail 48 and culmen 9 mm., thus falling within the size range as given by Chapin (1962: 43–44). In colour it agrees closely with the female discussed by Long from Malawi,